

Information needed based on EPA/UEC conference call on Tuesday, September 25, 2012.

Stacey Dwyer to: Harry Anthony, craig w. holmes, Andy Barrett
Cc: Wren Stenger, William Honker, Sam Coleman, Philip Dellinger, Ray

09/26/2012 08:34 AM

Leissner, David Gillespie

From:

Stacey Dwyer/R6/USEPA/US

To:

Harry Anthony <hanthony@uraniumenergy.com>, craig w. holmes

<pommelhouse@sbcglobal.net>, Andy Barrett <Andy@thebarrettfirm.com>

Cc:

Wren Stenger/R6/USEPA/US@EPA, William Honker/R6/USEPA/US@EPA, Sam Coleman/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA, Ray Leissner/R6/USEPA/US@EPA, David Gillespie/R6/USEPA/US@EPA

Harry,

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Thanks,

Stacey B. Dwyer, P.E. Associate Director Source Water Protection Branch US EPA Region 6 1445 Ross Avenue Dallas, Texas 75202 214-665-6729 phone 214-665-2191 fax

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Coleman/R6/USEPA/US@EPA

1 attachment

Sand B Summary xlsx

C. Please provide the date for the A-A' south fault cross sections. I assume the cross sections were based on data from a previous year (include both the date of data and a date of generation for this cross section). Email from Harry Anthony to Stacey Dwyer, et. al on Sept.14, 2012.

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Harry Anthony to: Sam Coleman, William Honker, Stacey Dwyer

09/14/2012 08:35 AM

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To: William Honker; Sam Coleman; Charles Maquire <charles.maguire@tceq.texas.gov>; Ann Codrington

Cc: Andy Barrett <andy@thebarrettfirm.com>; Ben Klein <klein@heatherpodesta.com>

Subject: Final Technical information for Goliad Aguifer Exemption

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Attached are the remaining files further detailing the Goliad clay thicknesses by sand throughout the entire area of review, and hydraulic gradient supporting the directionally of water flow from West to East.

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Question/Issue: I have the justification for disregarding BMW -7, but need a justification for all data that was not considered. Please include the contractor's name that took the water level data measurements.

Gradient Calculations

Estimates were developed for the regional gradient of all four sands (A, B, C and D) and the graben gradient for Sand A and Sand B. September 2008 UEC water level measurements were used to develop the estimates. For regional estimates, water levels from surrounding wells (provided by UEC) and water levels from the Texas Department of Licensing and Regulation's (TDLR) water well database were included where the completion sand could be estimated. Water level elevations were gridded using Surfer (Golden Software). Grid calculus options in Surfer were then used to calculate the gradient magnitude and direction for each grid node. These values were averaged to produce mean gradients. In calculation of the mean gradients, grid nodes with gradient directions between 270 and 360 degrees were excluded based on known regional gradient directions. Excluding these grid nodes from the calculation affected only the regional gradient calculations.

The following table describes the wells used for each gradient estimate.

Sand	Mean	Mean	Wells Used for Calculations
	Gradient	Gradient	
		Direction	
A (regional)	0.00125	86.39	UEC A-Sand Wells (Sept 2008 Data), Adjacent Wells (provided
			by UEC, various dates), Wells from the TDLR Database
B (regional)	0.00220	122.01	UEC B-Sand Wells (Sept 2008 Data), Adjacent Wells (provided
			by UEC, various dates), Wells from the TDLR Database
C (regional)	0.00199	118.78	UEC C-Sand Wells (Sept 2008 Data), Adjacent Wells (provided
			by UEC, various dates), Wells from the TDLR Database
D (regional)	0.00292	103.55	UEC D-Sand Wells (Sept 2008 Data), Adjacent Wells (provided
		7	by UEC, various dates), Wells from the TDLR Database
A (OMW)	0.00061	92.86	UEC OMW Wells (Sept 2008 Data)
B (BMW ed)	0.00061	89.60	UEC BMW Wells, excluding wells determined to be outliers
			(BMW-7, 9 and 12) (Sept 2008 Data)
A (graben ed)	0.00047	83.40	UEC A-Sand Wells (OMW wells, RBLA wells and PT_AD) within
			the graben (Sept 2008 Data)

The attached Excel file (Copy of WATER LEVELS - SEPT'08 (2).xls) contains the UEC water levels used for the calculations.

	Water Water Levels, f					
S.No.	WELL#	Levels, ft	(MSL)			
1		69.9	160.82			
2		70.35	160.81			
3		70.37	161.074			
4		74.91	161.34			
5		76.9	161.47			
6		75.4	161.51			
7	BMW-7	73	166.663			
8		69.1	162.153			
9		71.3	160.821			
	BMW-10	65.6	162.2			
11		55.3	162.143			
12		55.28	161.828			
	BMW-13	63.75	162.008			
		72.75	161.762			
-	BMW-15	78.35	161.499			
	BMW-16	71.27	161.411			
	BMW-17	65.9	161.345			
	BMW-18	64.2	160.977			
	BMW-19	67.05	160.78			
20		68.45	160.764			
21	Walled Street, Square of Stree	68.37	160.69			
22	BMW-22	69.05	160.696			
23	OMW-1	63.8	159.769			
24	OMW-2	72.85	159.583			
25	OMW-3	69.21	159.642			
26	OMW-4	78.7	159.222			
27	OMW-5	78.15	159.452			
28	OMW-6	76.65	159.078			
29	OMW-7	77.85	159.127			
30	0MW-8	74	158.938			
31	OMW-9	71.4	158.987			
32	PTW-1	64.4	162.093			
33	PTW-2	74.2	161.75			
34	PTW-3	77.4	161.529			
35	PTW-4	71.9	161.492			
36	PTW-5 73.85		161.152			
37	PTW-6	68.9	161.032			
38	PTW-7 73.2		161.1301			
39	PTW-8	78.2	161.343			
40	PTW-9	61.9	161.6995			
41	PTW-10	67.2	161.6032			
42	PTW-11	68	161.6577			

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43	PTW-12	72.97	161.1325
44	PTW-13	73.95	160.3801



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		Water	Water Levels, ft
S.No.	Well #	Levels, ft	(MSL)
45	CBP-1	78.25	161.18
46	PT-AU	55.35	193.929
47	PT-AD	85.6	159.831
48	PT-BU	75.2	169.667
49	PT-BD	80.37	162.168
50	PT-CU	77.25	167.235
51	PT-CD	78.1	163.754
52	PT-DU	81.64	166.351
53	PT-DD	92.56	150.706
54	WW-2	96.26	143.17
55	RBLA-1	64.75	158.7015
56	RBLA-2	83.54	158.983
57	RBLA-3	80.6	158.9996
58	RBLA-4	N/A	
59	RBLA-5	74.55	158.893
60	RBLB-1	74.4	161.3612
61	RBLB-2	51.65	170.5407
62	RBLB-3	71.71	161.3616
63	RBLB-4	73.1	161.7383
64	RBLB-5	73.55	161.1978
65	RBLC-1	77.88	169.0776
66	RBLC-2	70.65	163.9241
67	RBLC-3	65.1	162.1857
68	RBLC-4	60.8	163.7848
69	RBLC-7	77.15	169.0941
70	RBLD-1	56.15	165.5972
71	RBLD-2	84.8	148.2525
72	RBLD-3A	72.23	147.3022
73	RBLD-5	91.1	148.7382
74	RBLD-6	89.65	166.1632



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Water Well Surveys

		Septem	September-08		ch-10	Febru	ary-12	September-12	
		Water Levels,	WL Mean Sea	Water Levels,	WL Mean Sea	Water Levels,	WL Mean Sea	Water Levels,	WL Mean Sea
WELL#	TOC Elev (ft)	TOC (ft)	Level (ft)	TOC (ft)	Level (ft)	TOC (ft)	Level (ft)	TOC (ft)	Level (ft)
BMW-1	230.72	69.90	160.82	70.19	160.53	72.28	158.44	73.87	156.85
BMW-2	231.16	70.35	160.81	70.02	161.14	72.64	158.52	74.25	156.91
BMW-3	231.44	70.37	161.07	69.95	161.50	72.64	158.80		
BMW-4	236.04	74.91	161.13	74.01	162.03	77.04	159.00	78.68	157.36
BMW-5	238.36	76.90	161.46	76.41	161.95			80.79	157.57
BMW-6	237.07	75.40	161.67	74.95	162.12	77.81	159.26	79.55	157.52
BMW-7	234.90	73.00	161.90	71.97	162.94	75.32	159.58	77.04	157.86
BMW-8	230.91	69.10	161.81	68.63	162.28	71.33	159.58	72.95	157.96
BMW-9	233.12	71.30	161.82	71.57	161.55	73.68	159.44	75.34	157.78
BMW-10	227.90	65.60	162.30	65.48	162.42	67.94	159.96	69.62	158.28
BMW-11	217.07	55.30	161.77	55.59	161.48	57.35	159.72		
BMW-12	217.28	55.28	162.00	54.61	162.67	57.26	160.02		
BMW-13	225.61	63.75	161.86	63.57	162.04	66.05	159.56		
BMW-14	234.51	72.75	161.76	72.79	161.72	75.06	159.45	WESTERNAME	
BMW-15	239.78	78.35	161.43	78.56	161.21	80.63	159.15		
BMW-16	232.68	71.27	161.41	71.66	161.02	73.60	159.08	BONEPE V	
BMW-17	226.98	65.90	161.08	66.09	160.89	67.94	159.04	69.56	157.42
BMW-18	225.11	64.20	160.91	63.97	161.14	66.48	158.63	68.12	156.99
BMW-19	227.89	67.05	160.84	66.86	161.03	69.32	158.57	70.93	156.96
BMW-20	229.00	68.45	160.55	68.09	160.91	70.50	158.50	72.10	156.90
BMW-21	228.85	68.37	160.48	68.67	160.18	70.65	158.20	72.25	156.60
BMW-22	229.67	69.05	160.62	69.41	160.26	71.33	158.34	72.92	156.75
PTW-1	226.29	64.40	161.89	74.14	152.16	66.80	159.49	68.45	157.84
PTW-2	236.02	74.20	161.82	74.40	161.62	76.50	159.52		
PTW-3	238.80	77.40	161.40	76.97	161.83	79.70	159.10		
PTW-4	233.20	71.90	161.30	72.32	160.87	74.18	159.02	""等是是	
PTW-5	235.09	73.85	161.24	73.77	161.32	76.16	158.93		
PTW-6	230.04	68.90	161.14	69.01	161.03	71.15	158.89	72.81	157.23
PTW-7	234.46	73.20	161.26	74.02	160.45	75.48	158.98	105 T 10 10 10 10 10 10 10 10 10 10 10 10 10	
PTW-8	239.44	78.20	161.24	78.00	161.44	80.55	158.89		
PTW-9	223.81	61.90	161.91	60.13	163.68	64.25	159.56		
PTW-10	228.68	67.20	161.48	74.26	154.42	69.58	159.10	71.21	157.47

	RBLB-5	RBLB-4	RBLB-3	RBLB-1	PTW-14 (CBP-1)	PTW-13	PTW-12	PTW-11
	234.55	234.84	233.07	235.76	239.77	234.38	234.26	229.66
equals no data o	73.55	73.10	71.71	74.40	78.25	73.95	72.97	68.00
colleted	161.00	161.74	161.36	161.36	161.52	160.43	161.29	161.66
	73.64	73.62	72.57	75.31	78.71	74.20	73.27	67.39
	160.91	161.22	160.51	160.45	161.06	160.18	160.99	162.27
	75.80	75.42	74.00	76.68	80.58	76.21	75.23	70.35
	158.75	159.42	159.07	159.08	159.19	158.17	159.03	159.31
	77.46							
	157.09							



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To:

Harry Anthony harry ha

<pommelhouse@sbcglobal.net>, Andy Barrett <Andy@thebarrettfirm.com>

Cc:

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Cross Section A - A'

The new cross section (A - A'), extending from boring 32201-N183 to boring 32203-52, crosses the Southeast fault between borings 32203-39 and 32203-45. The offsets between the sands at the fault are very similar to those seen on cross section C - C', which was reviewed in the 8/21/2012 telephone conference call with Region 6. The new cross section A - A' crosses the Southeast fault about 400 feet southwest of cross section C - C'. Based on these cross sections, the top of Sand B in the graben (where PAA-1 mining will occur) is offset from the base of Sand A south of the fault by approximately 77 feet on cross section A - A' and 73 feet on cross section C - C', preventing any direct communication between Sand B inside the graben with Sand A south of the graben.

Regarding the two mapped faults in the Mine Permit Area, Dr. William Galloway in his Direct Testimony stated:

"... there is no evidence suggesting that the faults currently serve as a hydraulic connection between the sands, and there is substantial data refuting that possibility."

Dr. Galloway's conclusions, along with the significant offset between Sand B and Sand A, indicate that Sand B is not in communication with Sand A near the Church wells.



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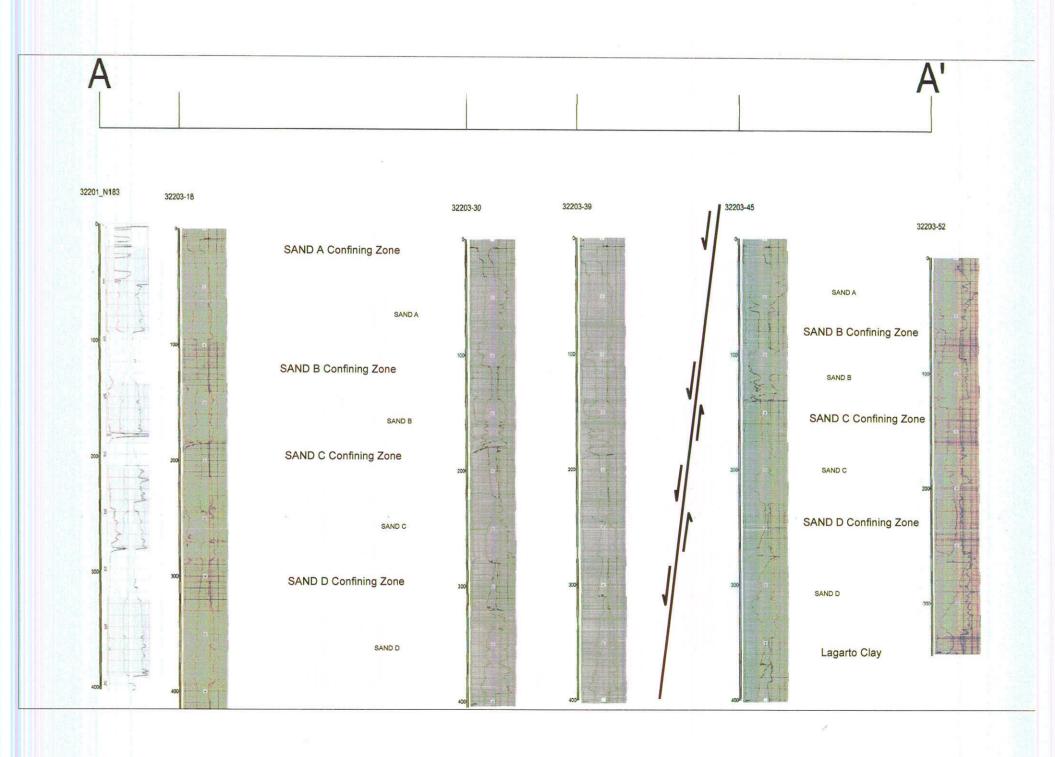
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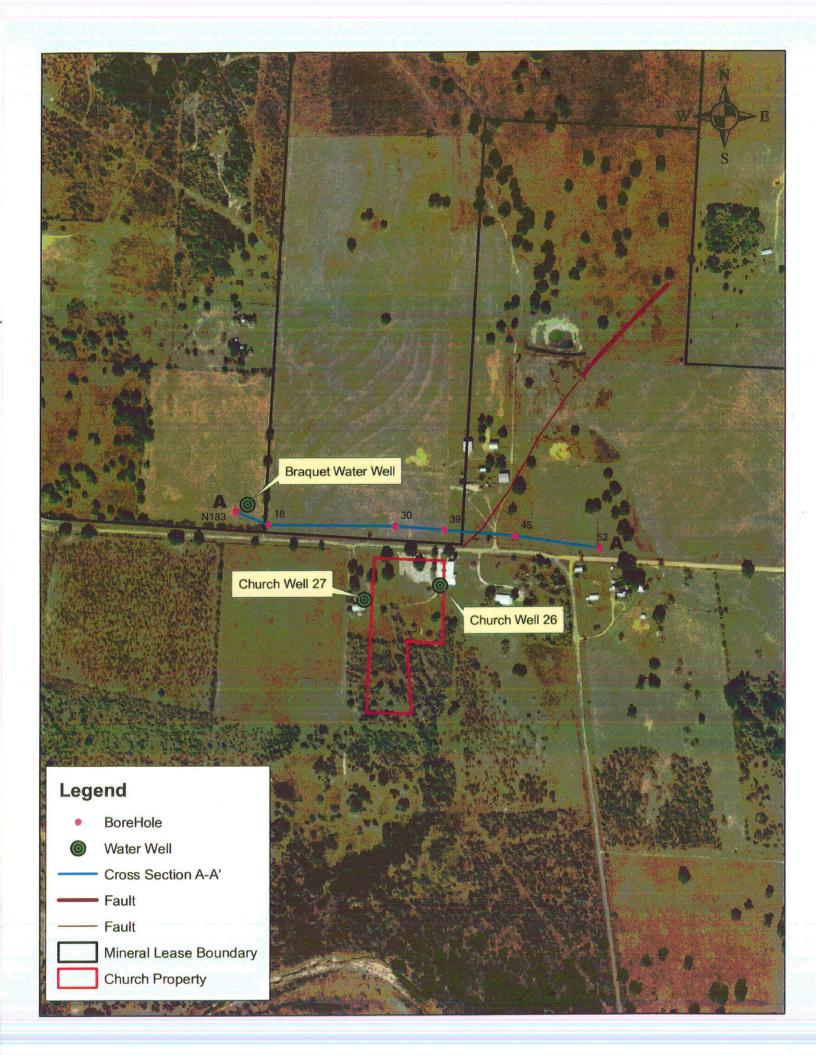
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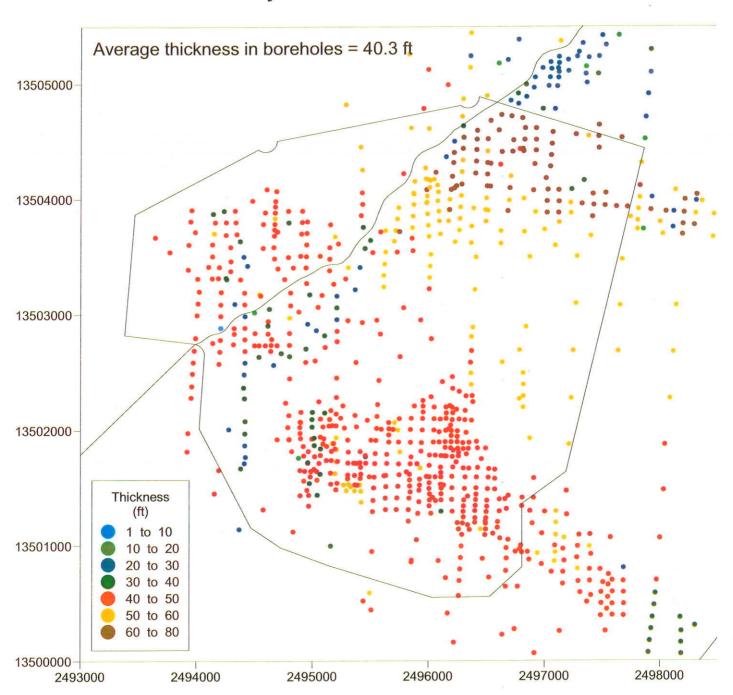


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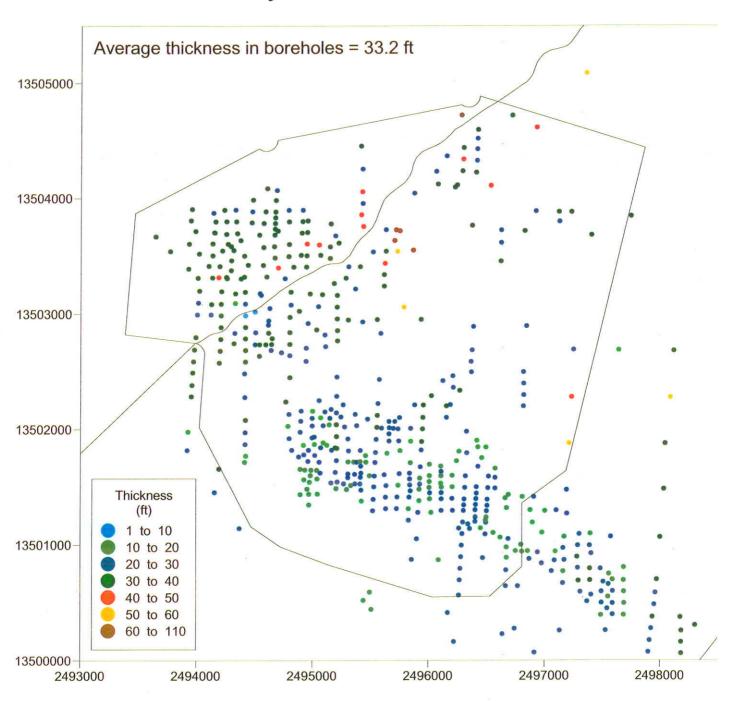
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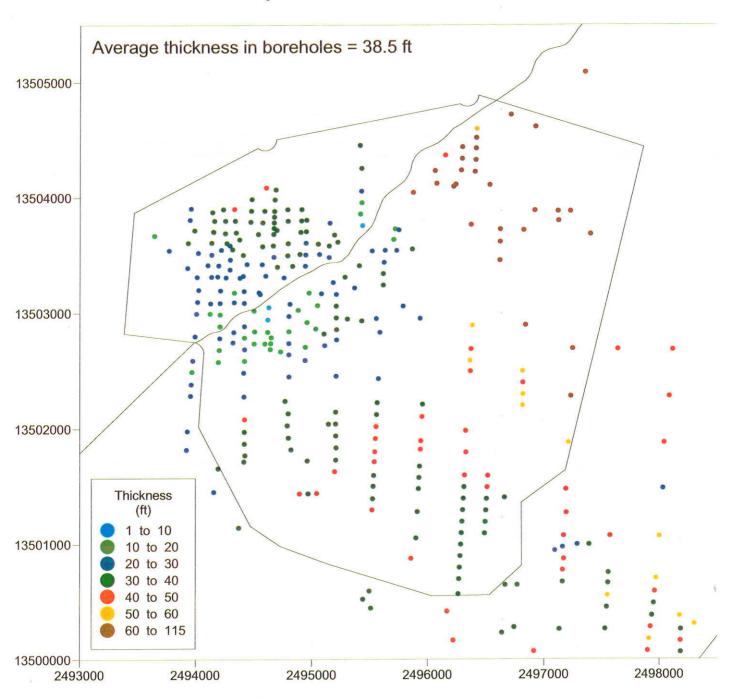
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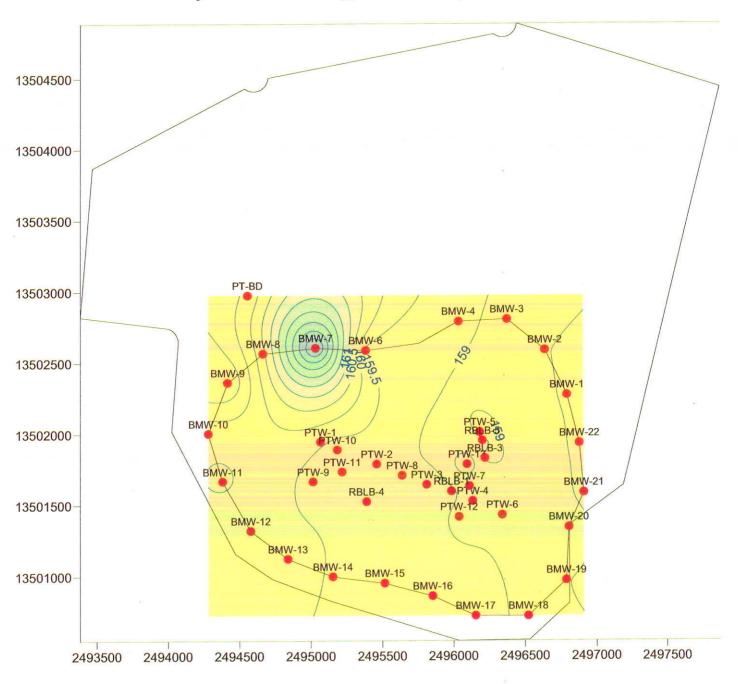
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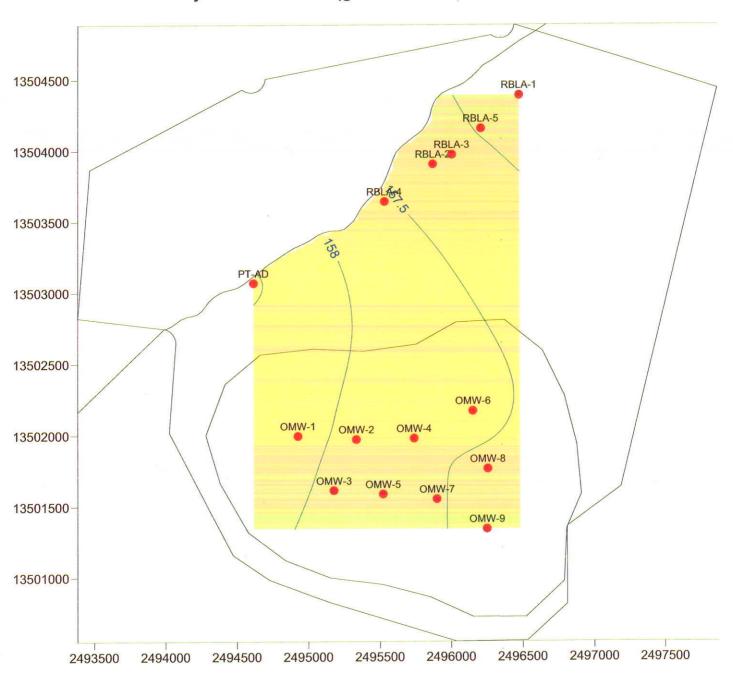
CD Clay Thickness in Boreholes



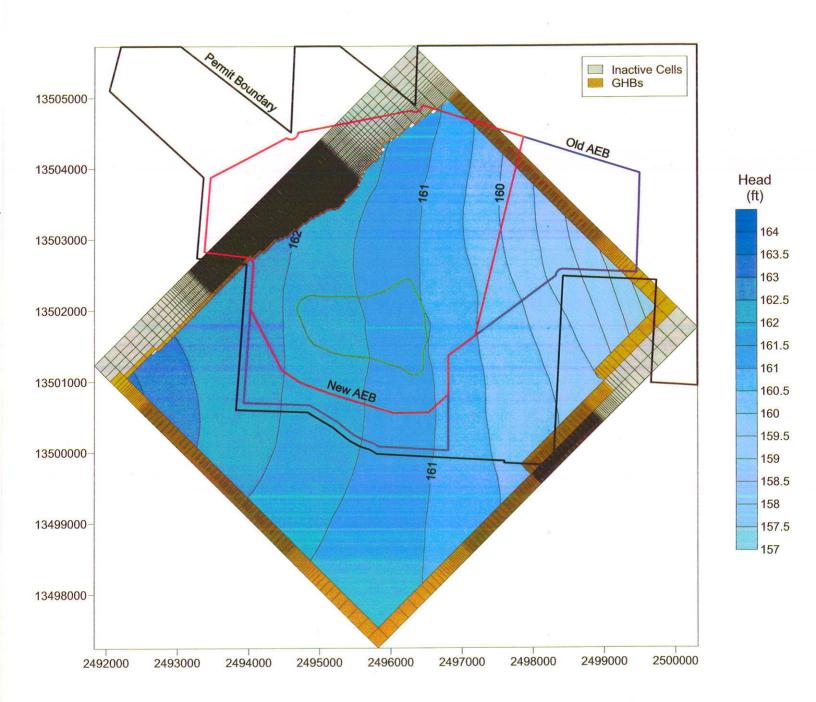
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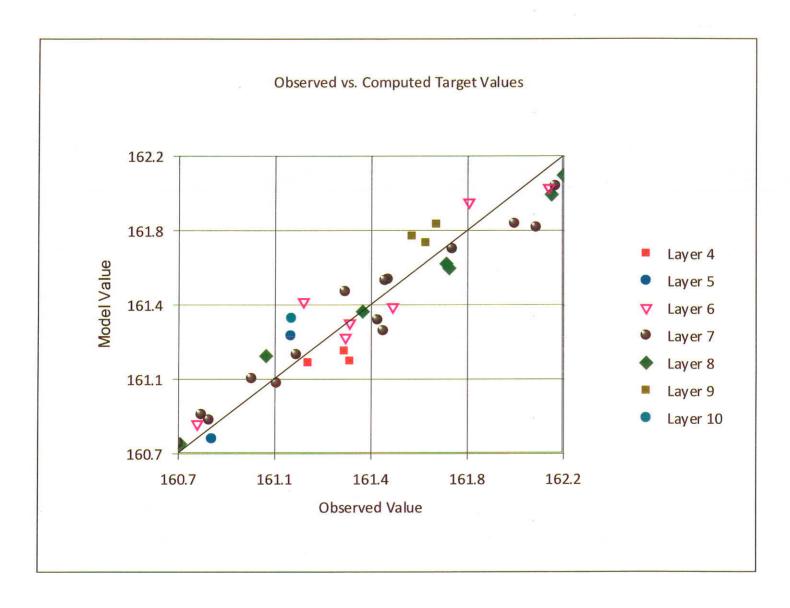
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B-Area Production Model Steady-State Heads



B-Area Production Model Calibration



Residual Mean	0.00
Res. Std. Dev.	0.13
Sum of Squares	0.64
Abs. Res. Mean	0.11
Min. Residual	-0.28
Max. Residual	0.25
Range in Target Values	1.51
Std. Dev./Range	0.09
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Harry L. Anthony, IV PE | Chief Operating Officer - Director

Uranium Energy Corp.

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NYSE MKT: UEC | www.uraniumenergy.com



Goliad Clay Thk and Hydraulic Gradient Details West to East June 13-2012.pdf Goliad GW Flow and Clay Tkness June 13-2012.pdf

Hydraulic Gradien

Goliad Up Gradient Wells June 13-2012.pdf

E. Water Level Data disregarded. From our discussion, at least 4 data points were not considered in the development of contour maps (specifically, BMW-7, PTW 4 through 6).

Question/Issue: I have the justification for disregarding BMW -7, but need a justification for all data that was not considered. Please include the contractor's name that took the water level data measurements.



Groundwater Flow and Aquitards

Slides 1 through 3 show the thickness at boreholes for the clay layers between the A-sand and the B-sand, the B-sand and the C-sand, and the C-sand and the D-sand, respectively. Clay thicknesses were calculated for each borehole that had both upper and lower contacts for the clay. Picks for the top and base elevations for each sand intersected by a borehole were determined by UEC geologists from borehole logs. The average thickness of the clay between the A-sand and the B-sand is about 40 feet. For the clay between the B-sand and the C-sand, it is about 33 feet, and between the C-sand and the D-sand about 39 feet. These clays serve as an effective confining unit between the sand layers.

Slide 4 shows a contour plot of hydraulic head for the B-sand for February 2012. All B-sand wells within the graben area were used to develop the contour plot. As can be seen from the data, flow directions within the graben are generally west to east. Well BMW-7 appears to have a survey elevation error since it measures from about four to six feet above all of the other wells. Slide 5 shows a similar contour plot of hydraulic head for the A-sand in February of 2012. Consistent with the B-sand, head contours define a generally west to east hydraulic gradient.

Simulated head results for the B-Area Production Model under steady-state conditions are shown in Slide 6. The model is bounded by the northwest and southeast faults. Groundwater flow in the model is <u>west to east</u>. Slide 7 shows calibration results and statistics for the model, which indicate that the model is well calibrated.



Information needed based on EPA/UEC conference call on Tuesday, September 25, 2012.

Stacey Dwyer to: Harry Anthony, craig w. holmes, Andy Barrett
Wren Stenger, William Honker, Sam Coleman, Philip Dellinger, Ray

09/26/2012 08:34 AM

Leissner, David Gillespie

From:

Stacey Dwyer/R6/USEPA/US

To:

Harry Anthony harry Anthony harry harry harr

<pommelhouse@sbcglobal.net>, Andy Barrett <Andy@thebarrettfirm.com>

Cc:

Wren Stenger/R6/USEPA/US@EPA, William Honker/R6/USEPA/US@EPA, Sam Coleman/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA, Ray Leissner/R6/USEPA/US@EPA, David Gillespie/R6/USEPA/US@EPA

Harry,

Here is some of the information that we need. If you have any questions, please contact Phil Dellinger at 214-665-8324 or Ray Leissner at 214-665-7183. I will be in the office today, however, I will be out of the office on Thursday afternoon and all day Friday.

Thanks,

Stacey B. Dwyer, P.E. Associate Director Source Water Protection Branch US EPA Region 6 1445 Ross Avenue Dallas, Texas 75202 214-665-6729 phone 214-665-2191 fax

A. Here is a scan of the tables that were hand delivered to William Honker by Craig Holmes at the EPA/UEC/TCEQ meeting in Austin on September 7, 2012.

2 files, because my scanner didn't scan the 4th page with the original file.

- UEC water level data.pdf

- UEC water level data p4.pdf

Question: What is the date for these water level measurements?

Question/Issue: On Monday, September 24, 2012, Craig Holmes sent Stacey Dwyer a " sand B Summary Table" with water level data from 2008, 2010, and 2012. However, this data does not appear to match up for any of the years on the table . If this data is from another month of a year , please correct your table and add this data with the correct month and year . Please refer to Item B below for the Summary Table.

B.

Cc: William Honker, Philip Dellinger, Sam Coleman

From:

"craig w. holmes" <pommelhouse@sbcglobal.net>

To:

Stacey Dwyer/R6/USEPA/US@EPA

Cc:

William Honker/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA, Sam

Coleman/R6/USEPA/US@EPA

1 attachment

Sand B Summary xdsx

C. Please provide the date for the A-A' south fault cross sections. I assume the cross sections were based on data from a previous year (include both the date of data and a date of generation for this cross section). Email from Harry Anthony to Stacey Dwyer, et. al on Sept.14, 2012.

UEC Option 2(c)

Harry Anthony to: Sam Coleman, William Honker, Stacey Dwyer

09/14/2012 08:35 AM

Cc: Ben Klein, Craig Holmes

From:

Harry Anthony harry <a href="mailto:harry"

To:

Sam Coleman/R6/USEPA/US@EPA, William Honker/R6/USEPA/US@EPA, Stacey

Dwyer/R6/USEPA/US@EPA

Cc:

Ben Klein <klein@heatherpodesta.com>, Craig Holmes <pommelhouse@sbcglobal.net>

3 attachments







A-A' Note.pdf XSection_A-A'_SouthFault_BW.pdf CrossSectionA-A'Locations.pdf

D. See email from Harry Anthony to William Honker, et. al. The first file (labeled Goliad Clay Thk and Hydraulic Gradient Details West to East), page 4 has a graphic titled "February 2012 B-sand (graben wells) Water Levels.

From: Harry Anthony [hanthony@uraniumenergy.com]

Sent: 07/13/2012 09:54 PM GMT

To: William Honker; Sam Coleman; Charles Maquire <charles.maguire@tceq.texas.gov>; Ann Codrington

Cc: Andy Barrett <andy@thebarrettfirm.com>; Ben Klein <klein@heatherpodesta.com>

Subject: Final Technical information for Goliad Aquifer Exemption

Dear Bill,

Attached are the remaining files further detailing the Goliad clay thicknesses by sand throughout the entire area of review, and hydraulic gradient supporting the directionally of water flow from West to East.

I'd like to propose that we follow up with a call on Monday afternoon after your review of the information to conclude any lingering questions... Hopefully we can finalize everything over a phone call negating the need to meet in Austin Wednesday morning.. But if that is what is needed, we are prepared to sit down with TECQ and EPA at that time.

Thank you, and have a good weekend..

Harry L. Anthony, IV PE | Chief Operating Officer - Director

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Goliad Clay Thk, and Hydraulic Gradient Details West to East June 13-2012.pdf Goliad GW Flow and Clay Tkness June 13-2012.pdf

Goliad Up Gradient Wells June 13-2012.pdf

E. Water Level Data disregarded. From our discussion, at least 4 data points were not considered in the development of contour maps (specifically, BMW-7, PTW 4 through 6).

Question/Issue: I have the justification for disregarding BMW -7, but need a justification for all data that was not considered. Please include the contractor's name that took the water level data measurements.

Up-Gradient Wells

The region from which a pumping well produces water is called the capture zone. The capture zone for a well has a parabolic shape, opening in the up gradient direction. The down gradient limit of the capture zone is defined by the stagnation point, the point where the groundwater flow rate in the aquifer and flow rate to the well have equal magnitude, but opposite direction. For a uniform flow field, the down gradient distance from the well to the stagnation point can be determined using the equation shown in Figure 9(b) of Cohen et al (1997). The pumping rate of the well, transmissivity of the aquifer, and hydraulic gradient of the aquifer are needed for this calculation.

The base case pumping rate for a rural domestic well was selected based upon county specific data. Initially, we contacted Kevin Kluge of the Texas Water Development Board (Board) to attempt to get a state sanctioned estimate of rural/domestic per capita groundwater use. Mr. Kluge stated that the Board does not calculate such a per capita estimate. Instead, the Board estimates per capita use based upon municipal use and municipal population. Their number for Goliad County is 119 gpd/person.

We estimated the average household size in Goliad County, by consulting the Goliad County website at http://www.goliadcc.org/index.php/re-location-info.html. There it is reported that the average Goliad County household has 2.6 people. Taking 2.6 people multiplied by 119 gpd/person, one gets a daily use of 309.4 gpd/household. This equates to a pumping rate of 41.4 ft³/day.

The transmissivity of the aquifer, the product of the aquifer hydraulic conductivity and the aquifer thickness, was based on an average hydraulic conductivity determined from the pump tests conducted at the site and a thickness of 36 feet, the smallest average thickness for any of the sands (Table 6.1 of the Mine Permit Application). UEC used minimum thickness since reducing thickness increases the distance to the stagnation point. The gradient used for the base case was an average value developed from the September 2008 water level measurements for the B-sand production area monitor well ring.

Under the base case conditions, the capture zone for a pumping well would extend less than 16 feet in the down gradient direction. We evaluated three additional scenarios: 1) five times the average rural domestic pumping rate, 2) the 5th percentile B-sand gradient, and 3) hydraulic conductivity reduced by 50%. These changes increase the down gradient distance of the stagnation point, but the stagnation point remains far up gradient of the proposed aquifer exemption boundary for all up gradient wells. Results are presented in the following table.

Scenario	Pumping Rate O (ft3/d)	Hydraulic Conductivity K (ft/d)	Sand Thickness b (ft)	Transmissivity T (ft2/d)	Gradient i (ft/ft)	Stagnation Point (ft)
Average conditions (B-sand)	41.366	19.2	36	691.2	0.00061	15.61

Five times average water use / household	206.83	19.2	36	691.2	0.00061	78.07
5th percentile graben gradient	41.366	19.2	36	691.2	0.00035	27.21
Hydraulic conductivity reduced by 50%	41.366	9.6	36	345.6	0.00061	31.23

Reference

Cohen, Robert M., James W. Mercer, Robert M. Greenwald, and Milovan S. Beljin, 1997. Design Guidelines for Conventional Pump-and-Treat Systems, EPA/540/S-97/504, September 1997